



## Behavioral consequences of income and expense shocks

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### ABSTRACT

Despite the increasing prevalence of short-term income shocks (e.g., a temporary pay cut), research on how individuals' financial resilience to these shocks differs from expense shocks (e.g., car repairs) is underdeveloped. Here we build on prior research that explores the behavioral consequences of income and expense shocks and propose an intervention to mitigate the psychological toll posed by such shocks. Across three experiments, participants were presented with either a one-time income or a one-time expense shock and answered questions afterward. We found that one-time income shocks evoked more methods of coping, were harder to cope with, more impactful on daily life, and perceived as a greater loss than expense shocks of the same amount. A self-affirmation intervention successfully mitigated some of these deleterious effects. By differentiating one-time income shocks from one-time expense shocks, these findings provide a more nuanced understanding of decision-making during financial shortfalls. This evidence contributes to strategies used to manage financial emergencies and informs public policy to support household financial management.

### 1. Introduction

Financial emergencies are becoming increasingly pervasive. Prior to the COVID-19 pandemic, only 43% of Americans could cover an unexpected \$2000 cost (Lin et al., 2019), but in 2023, the same proportion could only afford an unexpected \$1000 cost (Gillespie, 2023). Such financial shocks have detrimental effects on household food insecurity (Leete & Bania, 2010), material hardship (Mills & Amick, 2010), and for children living in households experiencing financial shocks, poor educational outcomes and attainment (Gennetian et al., 2018; Hardy, 2014). Of these shocks, income volatility is particularly concerning for workers earning low wages who are resource-constrained and may lack the savings, assets, and access to credit that insure against negative fluctuations in earnings.

Prior financial resilience research has explored financial coping behavior in response to expense shocks, such as unexpected car repair (Larrimore et al., 2017; Lin et al., 2016; Lusardi et al., 2011; Federal Reserve, 2019), or income shocks, such as a dip in earnings (Hardy, 2014; Keys, 2018; Melford et al., 2017; Morduch & Schneider, 2017;

Larrimore et al., 2017; Solove et al., 2015). However, income and expense shocks are rarely compared together (except Berman et al., 2016; Bufe et al., 2022). The lack of nuance means that approaches to understanding people's responses to shocks do not appropriately consider the shock's specific context.

From a psychological perspective, it's possible that income shocks represent a drop in wealth, which may be perceived as more of a loss than expense shocks of the same magnitude. This perception may coincide with a fungible view of money, leading people to explore more coping options than if they were exposed to expense shocks of the same amount. Understanding how people respond to income and expense shocks can inform policymakers on how to help consumers prepare for and cope with different types of financial emergencies.

In this paper, we aim to contribute to the literature by conducting three experiments to test whether participants differentially cope with one-time income and expense shocks of the same amount. We explore differences in how people perceive and respond to these shocks, and further test a self-affirmation intervention that targets self-confidence to counteract any adverse psychological effects of financial shocks.

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We find that respondents are less able to cover a one-time income shock relative to an unexpected expense of the same size. Participants in households making less than \$25,000, women, and with less than a college degree were less able to cope with financial shocks, relative to their counterparts. Additionally, we find that participants needed to rely on more methods to cover income shocks relative to an expense shock of equal size. In the self-affirmation intervention, participants were instructed to describe a personal experience that made them feel successful and proud. We find that the intervention showed some efficacy in mitigating the negative psychological effects of financial shocks, with a greater efficacy for income shocks than expense shocks.

### 1.1. Financial shocks and volatility

When addressing these emergencies, one strand of financial resilience research has explored the impact and financial coping behavior of expense shocks, such as considering the implications of a short-term unexpected bill, expenditure, or other liability (Lin et al., 2016; Lusardi et al., 2011; The Federal Reserve, 2019). These studies generally ask participants to indicate whether they could cope with an expense shock of various amounts and how they would cover the expense.

Another strand has explored the impact of *income* shocks and coping techniques respondents can employ (Hardy, 2014; Keys, 2018; Larrimore et al., 2017; Melford et al., 2017; Morduch & Schneider, 2017; Solove et al., 2015). Some of these studies focus on severe shocks, such as a job loss, and coping techniques such as resorting to social networks and financial assets (Keys, 2018; Melford et al., 2017; Solove et al., 2015). Other studies seek to document the trends in income volatility—frequent fluctuations in income of all sizes (Hardy, 2014; Morduch & Schneider, 2017). Income volatility has become more prevalent due to new employment practices that shift the risk of employment from employers to employees (Henly & Lambert, 2014; Lambert et al., 2019). These *precarious* work arrangements have become more common, increasing volatility in workers' take-home pay, and hurting their psychological well-being and financial security (Henly & Lambert, 2014; Kalleberg, 2011; Lambert et al., 2019; Menta et al., 2021; Schneider & Harknett, 2019).

Less focus, however, has been dedicated to a comparison of how people respond to income and expense shocks of identical amounts. Recent evidence shows that individuals weigh income changes more heavily than expense changes for determining future budgets (Berman et al., 2016) and in determining their subjective well-being (Bufe et al., 2022), suggesting a meaningful psychological distinction between the two types. Distinguishing between income and expense shocks and understanding differences in the coping abilities and strategies used, can shed light on how people cognitively frame negative shocks to their personal budgets. We extend these findings by investigating whether this cognitive weighting holds for financial shocks and by elaborating on the behavioral consequences of this weighting.

### 1.2. Broad vs. narrow framing

The theoretical motivation of the current study is that income shocks and expense shocks trigger different framing. We hypothesize that different framing impacts the perceived options and difficulty of coping with a given financial emergency. Specifically, we predict that income shocks may trigger *broad framing* because the financial shortfall may be perceived as a drop in general wealth, whereas expense shocks may trigger *narrow framing* because the shortfall is associated with a specific label (e.g., an unexpected bill). Prior work demonstrates that when people experience losses with specific financial labels, they tend to engage in narrow framing, defined as paying attention to narrowly defined losses within a specific mental financial account, compared to changes in their total wealth more broadly (Barberis & Huang, 2001).

The different framing can cause people to engage in different mental accounting strategies to cope with an unexpected shock, affecting the

mental accounts people draw upon to resolve the shortfall (Thaler, 1999). There is no literature directly exploring the extent to which shocks impact perceptions of wealth, and the present studies offer an opportunity to test this hypothesis. Specifically, we predict that the broad framing of income shocks may coincide with a fungible view of money, leading people to consider additional coping options, compared to the narrow framing of expense shocks. However, the broad framing of income shocks may also lead to a greater perceived difficulty of coping because the drop in wealth may be perceived as more of a loss than expense shocks of the same magnitude. As such, we predict that people are more willing to save for future emergencies after encountering an income shock compared to an expense shock of the same amount.

Past literature on mental accounting supports these predictions. For example, research shows that narrow framing leads people to isolate each risk when making decisions under uncertainty, which can prioritize short-term options and ignore long-term outcomes (Gennettian & Shafir, 2015; Kahneman & Lovallo, 1993; Shah et al., 2012). This narrow framing can consequently impact the mental accounts people use to manage their household spending and budget – a process that seems to be more explicit for individuals with fewer financial resources (Heath & Soll, 1996; Thaler, 1999). By contrast, broad framing may highlight general losses, which may reduce the perceived ability to cope with the shock. To date, many of the conclusions that have been drawn from this work have not accounted for the psychological component of how different types of shocks may be construed.

People facing an income shock may neglect the fact that their overall wealth will not be detrimentally impacted due to unemployment insurance, savings, or other sources. People facing an expense shock may perceive that they have more options to deal with that shock, such as putting an unexpected car repair bill on a credit card. This scenario demonstrates a specific example of narrow framing since people can also cover a drop in income by putting expenses on the credit card. As such and given the prior literature, we think that narrow versus broad framing can be a potential mechanism. Ultimately, while it may be more rational for people to treat different types of shocks differently, the literature on financial resilience has not acknowledged this distinction. The current study provides a more nuanced look at these questions and some evidence about a potential mechanism.

### 1.3. Self-affirmation and financial resilience

To mitigate the psychological burdens of financial shocks, we propose that self-affirmation can boost financial resilience to help people better cope with financial shocks. Self-affirmation theory suggests that individuals are motivated to maintain integrity to the self and to restore their self-image when their identity is under threat (Steele, 1988). When positive aspects of self-image are affirmed, this motivation enables individuals to respond less defensively in threatening situations (Sherman & Cohen, 2006). A previous study tested this theory as an intervention to mitigate threats of poverty and showed that a self-affirmation intervention not only improved cognitive functioning but also increased interests in benefit programs in low-income individuals (Hall et al., 2014). The study documented the first evidence that self-affirmation can increase cognitive ability and receptivity to welfare services that may otherwise appear threatening. Further studies demonstrate that higher self-efficacy for low- and middle-income individuals can encourage saving behavior (Lown et al., 2015). Building on this evidence, we predict that self-affirmation can increase financial resilience to shocks by mitigating perceived coping difficulties and improving self-confidence in handling future problems. Since income can affect self-esteem (Araujo & Lagos, 2013) and income shocks are expected to be harder to cope with than expense shocks, we hypothesize that self-affirmation may have a larger beneficial impact for income shocks.

#### 1.4. Current study

Our research design builds on the work of Lusardi et al. (2011) and other scholars who have examined the ability to handle financial shocks (Larrimore et al., 2017; Lin et al., 2016; Lusardi et al., 2011). Lusardi et al. (2011) explicitly state, that one limitation of their study was an inability to discern “whether respondents are thinking of a consumption [a.k.a. expense] shock or an income shock, which would have rather different consequences” (p. 6). Given the prior research on mental accounting and more specifically narrow framing, we anticipate that individuals may view income and expense shocks differently.

Across three experiments, we examine how income shocks and expense shocks influence coping abilities, impact on life, loss perception, and willingness to contribute to emergency savings. These behavioral consequences will be measured in randomized experiments that manipulate both the type of shock (income vs. expense) and the amount (\$400 vs. \$2000). These amounts are identical to those in major surveys, such as the Survey of Household Economics and Decision making, as well as those tested in prior literature (Lusardi et al., 2011). Moreover, we aim to test a self-affirmation intervention that targets self-confidence to counteract any adverse psychological effects of financial shocks. In Experiment 1, we hypothesize that income shocks will be perceived as more difficult to cope with than expense shocks of the same amount. We also expect that individuals will perceive a need to rely on more methods to cope with income shocks relative to expense shocks. In Experiment 2 (pre-registered on osf.io/z864d), we hypothesize that income shocks and large shocks will lead to greater coping difficulty, a greater impact on daily life, a greater perception of loss, and a greater willingness to contribute to emergency savings than expense shocks or smaller shocks. In Experiment 3 (pre-registered on osf.io/5c943), we will test a self-affirmation intervention to mitigate the psychological effects of both income and expense shocks. We predict that the intervention will reduce coping difficulty, impact on daily life, perception of loss, and increase self-confidence and the willingness to contribute to emergency savings as compared to a control condition. We hypothesize that self-affirmation will have a larger beneficial impact for income shocks than expense shocks.

By distinguishing the experience of different shock types, the current work contributes new insights on how people respond to and manage different financial shortfalls. Our findings can also provide important implications for scholars studying household finance, as well as policy professionals designing programs to help people cope with financial emergencies.

## 2. Experiment 1

### 2.1. Participants

We conducted the experiment with Amazon Mechanical Turk (MTurk) workers in the U.S. The data were collected in October and November of 2019, in two waves, to ensure there were no errors with implementation. Amazon Mechanical Turk provides a sample that is comparative to other non-probability-based survey methodologies and is more representative of the U.S. population than a convenience sample (Berinsky et al., 2012; Huff & Tingley, 2015; Hitlin, 2016). Despite having above-average education and share of female participants, participants' racial identity and household income closely reflects national averages (United States Census Bureau, 2019). Of all data collected, we obtained 2004 valid responses after excluding 196 observations because they were ineligible or had incomplete or invalid responses. A full description of participant demographics is presented in Table S1 in the Appendix.

### 2.2. Stimuli and procedure

Participants were randomly assigned into one of four conditions: a

small (\$400) expense shock, a small (\$400) income shock, a large (\$2000) expense shock, or a large (\$2000) income shock. After the data were collected, a balance check confirmed that each of the conditions were statistically identical (Table S2). In each condition, participants were asked how confident they were in their ability to handle a financial shock and rated their confidence on a scale from 1 to 4 (1=could, 2=probably could, 3=probably could not, 4=could not). The expense shock questions were written identically to prior studies to build on the existing literature (Lusardi et al., 2011). While the language across the income and expense conditions was not perfectly parallel, we aimed to create neutrally worded scenarios that were as similar as possible. The coping questions were worded as follows:

**Income Scenario:** If you were to make \$2000 (\$400) less income than usual this month, how confident are you that you would be able to cover all of your necessary expenses?

**Expense Scenario:** How confident are you that you could come up with \$2000 (\$400) if an unexpected expense arose within the next month?

All participants were subsequently asked about what methods they would use to handle that shock: “If you were to face this unexpected \$400 (\$2000) shortage (expense) in the next month, what methods would you use to (attempt to) handle this situation?” This question and the response options were also based on prior literature, with the response options most closely resembling those used by the Federal Reserve (Lusardi et al., 2011; Larrimore et al., 2017). Participants could select one or multiple of the following choices for coping with the financial shock: 1) With cash or money from my checking account, 2) With money from my savings account, 3) Put it on a credit card, and pay it off in full at the next statement, 4) Put it on my credit card and pay it off over time, 5) By borrowing from a friend or family member, 6) Using a payday loan, deposit advance or overdraft, 7) By selling something, and 8) Other. The full survey questionnaire is presented in the Appendix.

## 3. Results and discussion

We found that participants reported being less likely to handle an income shock compared to an expense shock, and this held for both the small (\$400) and large (\$2000) financial conditions [ $F(3,2003)=51.41$ ,  $p<.001$ ,  $\eta^2_p=.02$ ]. In line with previous research (Lin et al., 2016; Lusardi et al., 2011), we coded those who answered that they either (1) could or (2) probably could as being able to handle the shock and those who answered that they either (3) probably could not or (4) could not as being unable to handle the shock (Fig. 1). While 63% of participants indicated they would be able to handle an expense shock of \$2000, only 47% of participants indicated they would be able to cover an income shortage of \$2000 [ $X^2(1, 995)=24.66$ ,  $p<.001$ ]. For the groups exposed to the \$400 shock: 79% reported they would be able to handle the smaller expense shock, and 68% reported they would be able to handle the smaller income shock [ $X^2(1, 1009)=17.05$ ,  $p<.001$ ].

We also compared the number and types of methods used to address income or expense shocks of varying sizes, shown in Fig. 2 and Table S3. There was a significant difference in the number of methods used between the small financial shocks, but not the large, and this was driven by a lower share of participants in the small expense shock group that indicated they would use multiple methods to cover the shock (47.4%). In contrast, the other three groups had similar proportions of people resorting to multiple methods, 58.6%, 60.0%, and 56.7%. The small expense shock having the lowest proportion of people using multiple methods is consistent with the prior results, which showed that respondents assigned to this condition reported the greatest propensity to handle the shock. The lack of a significant difference in coping methods between the large income and large expense shock suggests that it is difficult to handle a \$2000 shock, regardless of whether the source of the shock is an income shortage or an unexpected expense.

In Table S3, we descriptively document the frequency of each type of method selected to cover the financial shocks. Individuals could pick multiple methods to cope with each shock. We find that individuals were

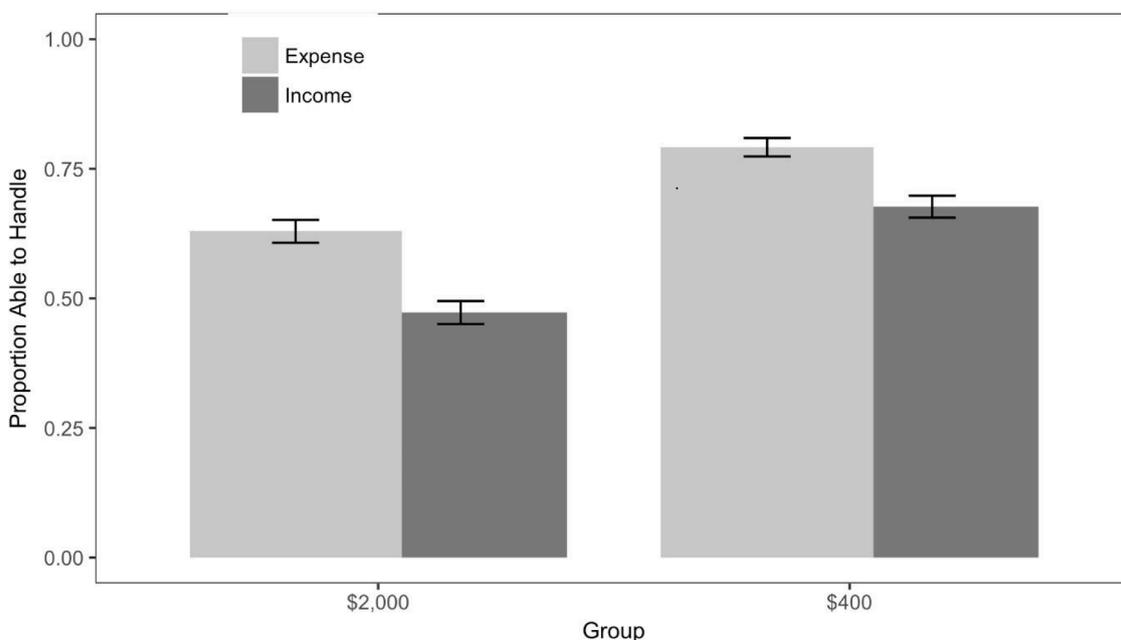


Fig. 1. Ability to handle shock by type and size in Experiment 1. Proportion of participants reporting could, or probably could, handle an expense versus an income shock for large (\$2000) and small (\$400) shocks. Error bars indicate  $\pm 1$  SE.

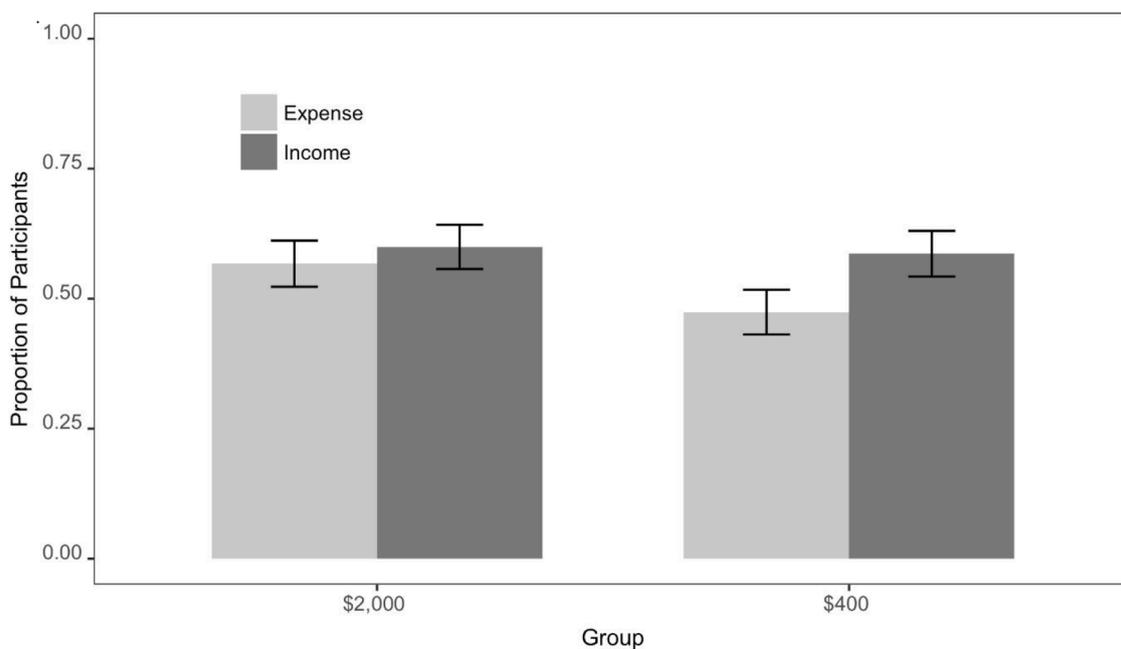


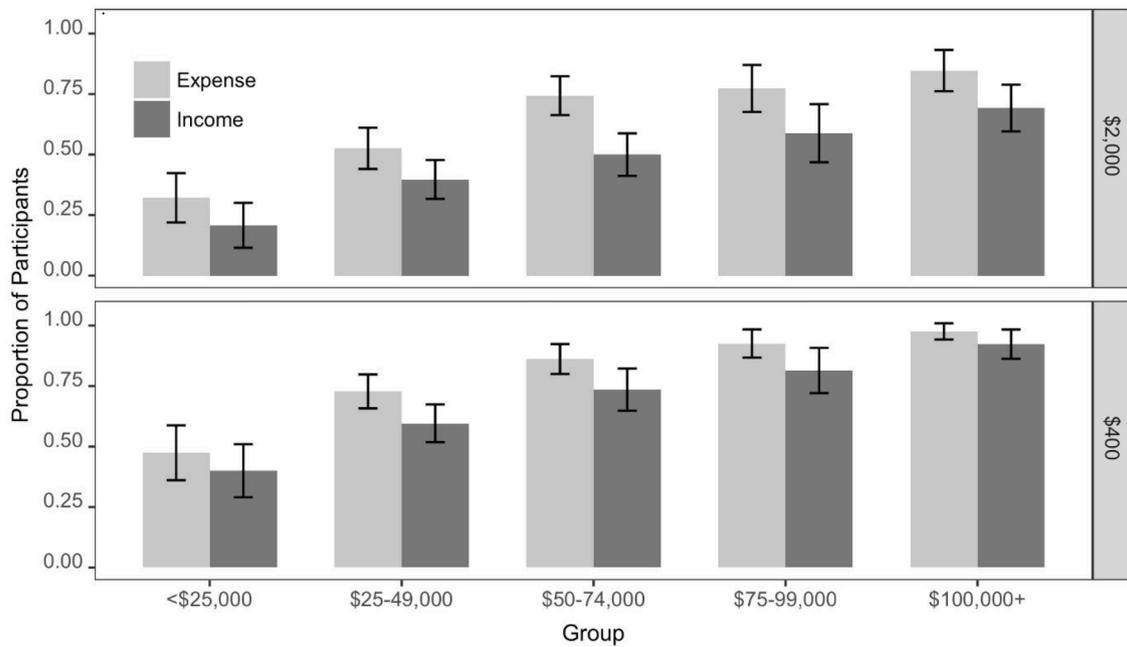
Fig. 2. Multiple coping methods by shock type and size in Experiment 1. Proportion of Participants reporting the need to use more than one method to handle an expense versus an income shock for large (\$2000) and small (\$400) amounts. Error bars indicate  $\pm 1$  SE.

more likely to report using a savings or checking account when faced with an expense shock, relative to an income shock, and when faced with a small shock, relative to a large shock (\$400 expense:42.5%; \$400 income: 40.6%; \$2000 Expense: 37.3%; \$2000 Income: 35.8%). Conversely, individuals were less likely to respond they would take on debt, such as putting an item on a credit card to pay overtime or a payday loan, for shocks of small amounts (\$400 Expense:16.3%, \$400 Income: 18.3%). There was no difference in the taking on debt between the large income and large expense shock, similar to the results for the number of methods, and further confirming the difficulty of handling a large shock.

To understand how a participant’s income affects their ability to

handle financial shocks, we examined the result of our experiment by household income groups. Our survey allowed respondents to pick from one of five possible options for their household income. These bands started at zero and were \$25,000 wide, with the last option being \$100,000 or more. While there are not equal shares in each income band, the conditional distributions of participants across the five income quintiles were equal across four conditions. In all the income subgroups, for both the \$400 and \$2000 shocks, participants were more likely to report being able to handle the expense shock than the income shock (Fig. 3, Table 1).

However, these differences were not significantly different for those in the lowest income bracket, or when comparing the small shock (\$400)



**Fig. 3.** Ability to handle shock by type and size split by income in Experiment 1. Proportion of participants reporting could, or probably could, handle an expense versus an income shock for large (\$2000) and small (\$400) shocks separated by income groups. Error bars indicate  $\pm 1$  SE.

**Table 1**

Percent of participants that could or probably could handle a shock, breakdown by income groups in Experiment 1.

	All income groups	<\$25K	\$25–49K	\$50–74K	\$75–99K	\$100+K
Expense \$2000	62.94	32.14	52.59	74.36	77.33	84.72
Income \$2000	47.27	20.78	39.73	50.00	58.82	69.23
p-value	<0.001	0.10	0.03	<0.001	0.02	0.02
Expense \$400	79.16	47.44	72.78	86.18	92.59	97.59
Income \$400	67.70	40.00	59.62	73.53	81.43	92.31
p-value	<0.001	0.345	0.01	0.02	0.04	0.12

in the group with the highest reported income. Additionally, for each of the four conditions, those in households making less than \$25,000 were less likely to be able to cope with a shock than those making from \$25,000 up to \$50,000, and individuals in this latter category were less likely to be able to cope than those making \$50,000 or more.

We also found that females reported that they would be less able to handle a financial shock [ $X^2(1, 1998)=27.12, p<.001$ ], and that this finding was consistent across all four groups. Having a bachelor’s degree or higher [ $X^2(1, 2002)=56.74, p<.001$ ] and being married or living with your partner [ $X^2(1, 2004)=24.95, p<.001$ ], were both associated with having a greater ability to cope across for all four of the financial shocks. We did not find any statistically significant differences in coping ability based on race [ $X^2(1, 2002)=0.02, p=.895$ ] or age [ $X^2(60, 2003)=61.63, p=.418$ ], and this finding held when controlling for income and group.

**4. Experiment 2**

This experiment aimed to replicate and extend the behavioral responses from Experiment 1 and to explore potential underlying mechanisms of loss perception in response to income and expense shocks.

**4.1. Participants**

We conducted a pre-registered online experiment which recruited 507 participants from MTurk in the U.S. (pre-registration: osf.io/z864d). A total of 79 participants were excluded using the pre-registered exclusion criteria: survey completion in less than one minute or greater than 15 min ( $N = 27$ ); and qualitative responses with less than five words or were viewed as nonsensical by the coders ( $N = 52$ ). Of the remaining 428 participants, the mean age was 39.85 years ( $SD=12.50$ ) and was equally split between female participants (50.6%) and male participants (48.5%). Participants’ median annual income was \$45,000. In terms of racial diversity, our sample was slightly biased whereby 69.9% were White; 14.3% were Asian; 8.4% were Black/African American; and 3.5% were Hispanic/Latino.

**4.2. Stimuli and procedure**

Participants ( $N = 428$ ) were randomly assigned to one of four conditions as in Experiment 1: a small income shock (\$400,  $N = 109$ ), a large income shock (\$2000,  $N = 107$ ), a small expense shock (\$400,  $N = 102$ ) or a large expense shock (\$2000,  $N = 110$ ). In each condition, participants first read a financial shock scenario, then rated how difficult it would be to cope with the scenario (1 = I will not have any difficulty, 7 = I will have significant difficulties), how much impact it would have on their daily life (1=It will have no negative impact whatsoever, 7=It will have significant negative impacts), how much they agreed with the statement that the shock felt like a pure loss to them (1=completely disagree, 7=completely agree), and how willing they would be to save money for future unexpected shocks (1=not willing at all, 7=very willing). Participants were then asked how much money they would be able to save on a monthly basis for financial emergencies and provided a long answer text box to describe how their lifestyle would change and whether it would require them to make sacrifices that have long-term consequences. The survey concluded by collecting the participants’ demographics on age, gender, annual income, and education level. The full survey is presented in the Appendix. The balance check confirmed that all conditions except for political orientation were statistically identical (Table S4).

5. Results and discussion

**Pre-registered Analyses.** We conducted a 2 (shock type: income vs. expense) x 2 (shock size: \$2000 vs. \$400) ANOVA on each of the four measures for each outcome studied (Table 2).

One-time income shocks were perceived as more difficult to cope with [ $F(1424)=14.25, p<.001, \eta^2_p=.03$ ], as having a larger impact on daily life [ $F(1424)=4.77, p=.03, \eta^2_p=.01$ ], and were perceived as more of a loss [ $F(1424)=5.41, p=.02, \eta^2_p=.01$ ] than expense shocks of the same amount (Fig. 4). However, contrary to our hypothesis, participants were more willing to save for expense shocks than income shocks [ $F(1424)=4.08, p=.04, \eta^2_p=.01$ ].

**Exploratory Analyses.** To explore the greater effect of expense shocks on willingness to save, we conducted a mediation analysis through bootstrapping with each behavioral response as a mediator (Table S5). This analysis revealed that the impact of shock type on willingness to save was significant without the involvement of coping difficulty [ $\beta=0.289, p=.04$ ], impact on life [ $\beta=0.298, p=.04$ ], and loss perception [ $\beta=0.289, p=.04$ ] as mediators. Further, when each behavioral response was included in the model, none of them significantly mediated the impact of shock type on willingness to save: coping difficulty [ $\beta=-0.020, p=.44$ ], impact on daily life [ $\beta=-0.013, p=.40$ ] and loss perception [ $\beta=-0.017, p=.31$ ]. Such findings indicate that the relationship was robust. A possible explanation is that as one-time expense shocks are tied to specific events while one-time income shocks have ambiguous causes, the specificity of expense shocks may encourage immediate actions more than income shocks. As a result, immediate willingness to save may increase after expense but not income shocks.

To determine if the relationship was robust with covariates (age, gender, personal annual income, political orientation), we conducted an ANCOVA on each measure. We found that after controlling for the covariates, all the main effects in pre-registered analyses were significant, except for willingness to save (see Table S6). This may suggest that the earlier effect of income shocks observed on willingness to save was driven by covariates. However, such conclusions are tentative as adding more parameters to conduct an ANCOVA may drive this lack of significance. For coping difficulty, gender [ $F(1420)=12.73, p<.01, \eta^2_p=.03$ ] and personal annual income [ $F(1420)=42.79, p<.01, \eta^2_p=.09$ ] were significant. They were significant for impact on life ([ $F(1420)=13.23, p<.01, \eta^2_p=.03$ ] for gender; [ $F(1420)=46.75, p<.01, \eta^2_p=.10$ ] for annual income). For perception of loss, only personal annual income was significant [ $F(1420)=22.47, p<.01, \eta^2_p=.05$ ]. No other covariates were significant.

A final exploratory analysis was done on how much participants were willing to save for future financial emergencies. Interestingly, we found a significant two-way interaction between shock type and shock size [ $F(1401)=6.37, p=.01, \eta^2_p=.02$ ], where participants were willing to save more money for future emergencies after encountering a \$2000 income shock than a \$400 income shock [ $t(201)=2.489, p=.01, d =$

**Table 2**  
Two-way ANOVA results on coping difficulty, impact on life, loss perception and willingness to save in Experiment 2.

Measures	F	p-value	$\eta^2_p$
Shock Size	12.34	< .001	0.03
Shock Type	14.25	< .001	0.03
Shock Size x Shock Type	1.66	0.20	0.00
Shock Size	21.89	< .001	0.05
Shock Type	4.77	0.03	0.01
Shock Size x Shock Type	2.69	0.10	0.01
Shock Size	18.85	< .001	0.04
Shock Type	5.41	0.02	0.01
Shock Size x Shock Type	0.08	0.77	0.00
Shock Size	0.01	0.91	0.00
Shock Type	4.08	0.04	0.01
Shock Size x Shock Type	0.19	0.66	0.00

0.25], but not for expense shocks [ $t(193)=0.768, p=.44, d = 0.02$ ]. This result suggests that larger income shocks trigger greater preparation for future financial emergencies than larger expense shocks, which contrast the finding on willingness to save.

6. Experiment 3

Experiments 1 and 2 suggest that income shocks place a greater psychological toll than expense shocks of the same amount. As a behavioral intervention to mitigate the effects, we administered a self-affirmation intervention before participants encountered the income or expense shock to see whether the intervention could mitigate negative behavioral consequences.

6.1. Participants

We conducted a pre-registered online experiment that recruited 1053 participants on MTurk (pre-registration: osf.io/5c943). A total of 179 participants were excluded based on pre-registered exclusion criteria: incomplete survey answers ( $N = 24$ ); survey completion in less than one minute or greater than 30 min ( $N = 50$ ); and qualitative responses that had less than five words or were viewed as nonsensical by the coders ( $N = 105$ ). The final sample size was  $N = 874$ , with a mean age of 33.7 years ( $SD=11.10$ ) whereby 48.3% of participants were female. This sample size exceeded the minimum size ( $N = 800$ ) required to detect an effect size of 0.10 with power=0.80, and alpha=0.05. Participants' median annual income was \$45,000 and 70.8% of our sample were White; 14.3% were Asian; 12.4% were Hispanic/Latino and 9.7% were Black/African American. The full survey is presented in the Appendix.

6.2. Stimuli and procedure

Participants were randomly assigned to one of eight conditions: 2 (affirmed vs. control) x 2 (shock type: income vs. expense) x 2 (shock size: large vs. small). In the affirmed conditions, participants were first instructed to describe a personal experience that made them feel successful and proud by typing their description in a text box. In the control conditions, participants were first instructed to describe their daily meal routine by typing their description in a text box (see Appendix Experiment 3 survey for more details). The balance check confirmed that all conditions except for race were statistically identical (Table S7). The same instructions were used in Hall et al. (2014) which examined the impact of self-affirmation on cognitive function and behavioral interests in benefit programs. Participants then responded to two questions that measured how they were feeling about themselves and how confident they were in handling future problems. Afterwards, participants were randomly assigned to the four conditions and completed the study as in Experiment 2.

7. Results and discussion

As a manipulation check, we found that participants in the self-affirmation condition felt significantly more positive about themselves [ $F(1866)=16.00, p<.001, \eta^2_p=.02$ ] and had significantly higher self-confidence in handling future problems [ $F(1866)=13.68, p<.001, \eta^2_p=.02$ ] than those in the control condition. This suggests that the self-affirmation intervention increased self-positivity and self-confidence.

**Pre-registered Analysis.** We found that self-affirmation significantly reduced coping difficulty [ $F(1866)=5.33, p=.02, \eta^2_p=.01$ ] and perceived loss [ $F(1866)=4.79, p=.03, \eta^2_p=.01$ ], but had no effect on impact on life [ $F(1866)=2.23, p=.14, \eta^2_p=.00$ ] or willingness to save [ $F(1866)=0.47, p=.49, \eta^2_p=.00$ ] (Table 3, Fig. 5). This suggests that self-affirmation mitigated some negative effects of financial shocks, although with limits in promoting savings.

As in Experiment 2, income shocks were consistently perceived as

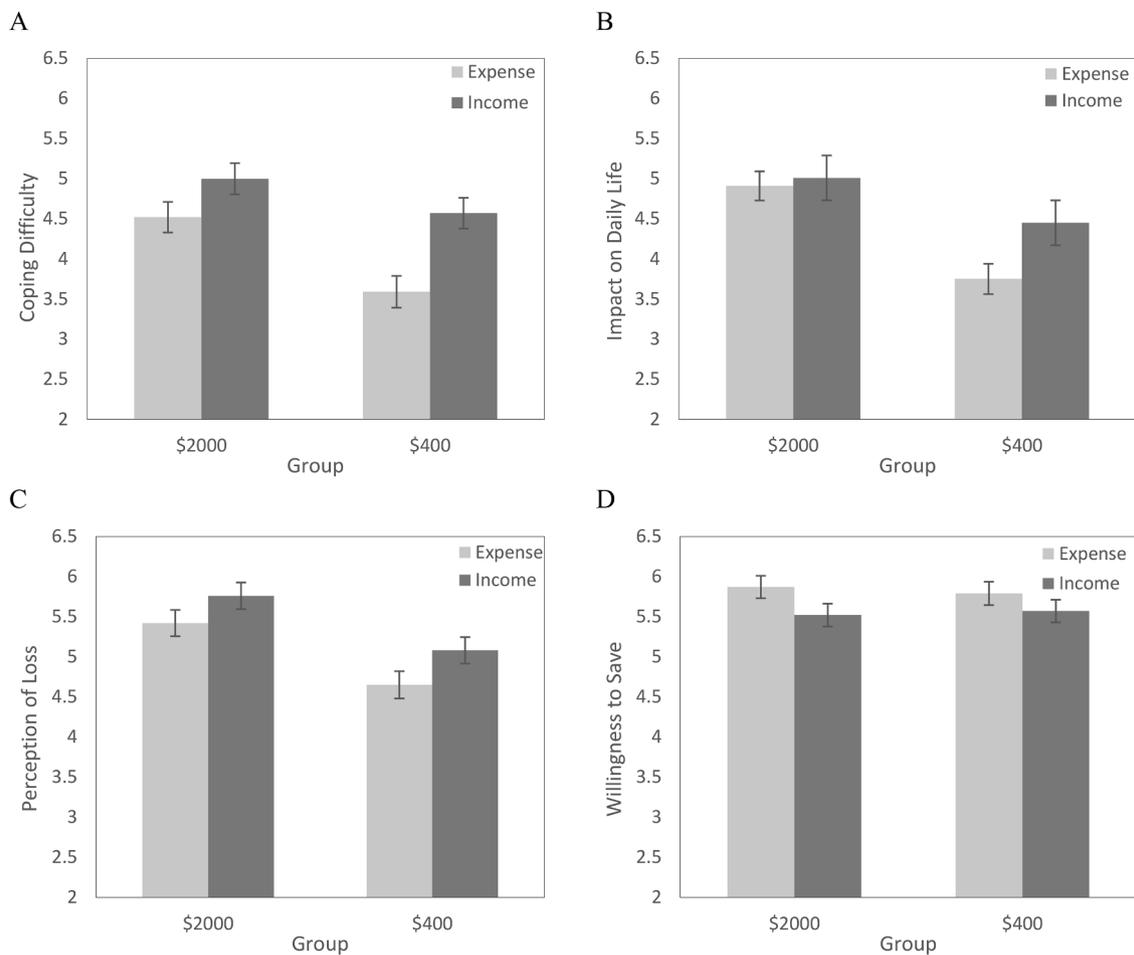


Fig. 4. Coping difficulty (A), impact on daily life (B), perception of loss (C), and willingness to save (D) by shock type and shock size in Experiment 2. Error bars indicate  $\pm 1$  SE.

more difficult to cope with [ $F(1866)=26.42$ ,  $p<.01$ ,  $\eta^2_p=.03$ ], had a larger impact on life [ $F(1866)=13.90$ ,  $p<.001$ ,  $\eta^2_p=.02$ ] and were perceived as more of a loss [ $F(1866)=9.80$ ,  $p<.01$ ,  $\eta^2_p=.01$ ] than expense shocks of the same amount. However, shock type did not have a significant effect on willingness to save [ $F(1866)=1.30$ ,  $p=.26$ ,  $\eta^2_p=.00$ ]. Larger shocks were perceived as more difficult to cope with [ $F(1866)=14.17$ ,  $p<.001$ ,  $\eta^2_p=.02$ ] and more impactful on daily life [ $F(1866)=14.17$ ,  $p<.001$ ,  $\eta^2_p=.02$ ] than smaller shocks. These results largely replicated the findings from Experiment 2.

**Exploratory Analyses.** The three-way ANOVA also showed a significant three-way interaction for coping difficulty [ $F(1866)=8.87$ ,  $p<.01$ ,  $\eta^2_p=.01$ ], and a marginal three-way interaction for impact on daily life [ $F(1866)=3.97$ ,  $p=.05$ ,  $\eta^2_p=.01$ ]. These interactions indicate that the difference between shock type and shock size varies across intervention types.

To explore the differential impact between the affirmed and neutral conditions, we conducted post-hoc t-tests for each shock type x shock size condition (see Table S8). We found that intervention effects may be largely driven by a relative decrease in coping difficulty [ $t(428)=-2.56$ ,  $p=.01$ ] and impact on life [ $t(428)=-2.42$ ,  $p=.02$ ] when affirmed prior to income shocks. No significant results were found for expense shocks: [ $t(442)=-0.80$ ,  $p=.43$ ] for coping difficulty; [ $t(442)=0.26$ ,  $p=.79$ ] for impact on life; [ $t(442)=-1.68$ ,  $p=.09$ ] for loss perception; and [ $t(442)=-2.56$ ,  $p=.32$ ] for willingness to save.

Further parsing this relationship, we found that affirmation significantly decreased coping difficulty [ $t(202)=-2.99$ ,  $p<.01$ ] and impact on life [ $t(202)=-2.60$ ,  $p=.01$ ] but only for small income shocks and not large ones. While expense shocks as a group did not show significant

differences, we found that affirmation significantly decreased coping difficulty and loss perception for large expense shocks [ $t(229)=-2.24$ ,  $p=.03$  for coping difficulty;  $t(229)=-2.36$ ,  $p=.02$  for loss perception]. On the other hand, there was no significant difference between affirmed and control conditions for small expense shocks for coping difficulty [ $t(211)=1.14$ ,  $p=.26$ ] or impact on life [ $t(211)=1.22$ ,  $p=.23$ ]. These findings suggest that the efficacy of self-affirmation was limited to small income shocks and large expense shocks, implying that we cannot generalize self-affirmation across different shock types and sizes.

We further completed a three-way ANCOVA controlling for covariates of age, gender, personal annual income, and political orientation (see Table S9). This analysis showed that after controlling for the covariates, the significant main effects in pre-registered analyses remained significant. In addition, personal annual income was a significant covariate for coping difficulty [ $F(1858)=85.61$ ,  $p<.001$ ,  $\eta^2_p=.09$ ], impact on life [ $F(1858)=102.05$ ,  $p<.001$ ,  $\eta^2_p=.11$ ], and perception of loss [ $F(1858)=29.70$ ,  $p<.001$ ,  $\eta^2_p=.03$ ]. Political orientation was also a significant covariate for willingness to save [ $F(1858)=7.38$ ,  $p=.01$ ,  $\eta^2_p=.01$ ]. No other covariates were significant.

A final exploratory analysis examined whether self-affirmation influenced the amount of money participants were willing to save for future financial emergencies. Self-affirmation unfortunately had no impact on savings amount [ $F(1829)=0.16$ ,  $p=.69$ ,  $\eta^2_p=.00$ ]. This is consistent with the pre-registered analysis showing the lack of impact of self-affirmation on willingness to save. However, as in Experiment 2, there was a significant two-way interaction between shock type and shock size [ $F(1829)=4.74$ ,  $p=.03$ ,  $\eta^2_p=.006$ ], where participants were willing to save more money for future financial emergencies after

**Table 3**

Three-way ANOVA results on coping difficulty, impact on life, loss perception and willingness to save in Experiment 3.

Measures	F	p-value	$\eta^2_p$
Intervention Type	5.33	0.02	0.01
Shock Type	26.42	< .001	0.03
Shock Size	14.17	< .001	0.02
Intervention Type x Shock Type	1.43	0.23	0.00
Intervention Type x Shock Size	0.26	0.51	0.00
Shock Type x Shock Size	5.35	0.02	0.01
Intervention Type x Shock Type x Shock Size	8.87	< .01	0.01
Intervention Type	2.23	0.14	0.00
Shock Type	13.90	< .001	0.02
Shock Size	15.24	< .001	0.02
Intervention Type x Shock Type	3.61	0.06	0.00
Intervention Type x Shock Size	0.02	0.89	0.00
Shock Type x Shock Size	4.88	0.03	0.01
Intervention Type x Shock Type x Shock Size	3.97	0.05	0.01
Intervention Type	4.79	0.03	0.01
Shock Type	9.8	< .01	0.01
Shock Size	3.42	0.07	0.00
Intervention Type x Shock Type	0.04	0.84	0.00
Intervention Type x Shock Size	0.58	0.45	0.00
Shock Type x Shock Size	2.90	0.09	0.01
Intervention Type x Shock Type x Shock Size	2.56	0.11	0.00
Intervention Type	0.47	0.49	0.00
Shock Type	1.30	0.26	0.00
Shock Size	0.10	0.76	0.00
Intervention Type x Shock Type	0.46	0.50	0.00
Intervention Type x Shock Size	0.70	0.40	0.00
Shock Type x Shock Size	2.96	0.09	0.00
Intervention Type x Shock Type x Shock Size	0.81	0.37	0.00

encountering a \$2000 income shock than a \$400 income shock, but this was not the case for expense shocks. This again suggests that larger income shocks elicit greater preparation for future financial emergencies than larger expense shocks.

## 8. General discussion

When policymakers and other advocates consider the short-term and long-term implications of financial hardships on financial stability, they may be making implicit assumptions about the type of hardship experienced and the ways people choose to cope with the hardship. These assumptions may influence the types of financial products and policy tools proposed to help people weather financial challenges. To date, the literature has largely treated all types of financial shocks as equal, or simply considered expense shocks as the most frequent, relevant, or challenging (Larrimore et al., 2017; Lin et al., 2016; Lusardi et al., 2011). The literature on mental accounting and budgeting, complemented by this study, suggests that this ought not to be the case (Barberis & Huang, 2001; Heath & Soll, 1996; Thaler, 1999). Our findings suggest that income shocks create a greater psychological toll relative to expense shocks, and self-affirmation can be an effective tool to mitigate some of the negative effects of the shocks. The findings suggest that people use different mental accounting strategies to frame and cope with income and expense shocks. Insights from this work can benefit researchers and policymakers who aim to improve the financial resilience of individuals and will allow for more informed and effective interventions to address them.

All three experiments demonstrated that people are less able to cover a shock in their income relative to an unexpected expense of equal size. This finding supports the hypothesis that the psychological transaction costs of an income shock are greater than those of an expense shock. The results suggest distinct mental accounting categories people use to track their income and expenses. The different behavioral responses elicited by income vs. expense shocks suggest that the source of the shock may trigger different framing. These results provide evidence of a potential mechanism, with income shocks framed broadly and expense shocks

framed narrowly. Participants reported using more methods of coping for income shocks, relative to expense shocks. While we do not find differences in behavioral responses by participant age or race, we do see differences across sex, education and cohabitation status, and income. In Experiment 1, women were less likely to report being able to handle a shock, relative to men in all conditions, while participants with higher education, greater household income, or being married or living with a partner were more likely to report they could handle financial shocks.

In Experiment 3, self-affirmation showed some efficacy in mitigating the negative psychological effects of financial shocks, with greater efficacy for income shocks than expense shocks. One explanation is that people may perceive income loss as a reflection of attributes of the self (e.g., competence, self-worth), whereas expense shocks are viewed as exogenous to one's attributes. Self-affirmation can protect against threats associated with the self and therefore be more effective for coping with income shocks. Self-affirmation interventions have been shown to have long-term effects across different domains (Goyer et al., 2017), so a one-time intervention could attenuate some of the psychological impact of future shocks.

Experiment 3 also showed that self-affirmation reduced coping difficulty and perceived loss from shocks but had no impact on willingness to save for future financial emergencies. This could be due to the possibility that self-affirmation generated more positive feelings about oneself and self-confidence in handling future problems, which may have attenuated the perceived severity of future problems and minimized the need to save. This calls for caution in using self-affirmation to increase financial resilience because it may be a double-edged sword: while it increases self-confidence and reduces perceived coping difficulty, it may not instigate meaningful actions to prepare for future financial emergencies. While prior research indicates that self-affirmation increases the likelihood of seeking information to improve financial standing (Hall et al., 2014), more research into self-affirmation is needed to determine whether increased perceived ability to cope translates to actual ability to cope.

The current findings have crucial implications for both researchers and policymakers who aim to improve the economic security of working individuals. Beyond the increased psychological transaction costs associated with income shocks, volatility may have downstream economic costs that affect workers' long-term financial security, such as increased debt or instability in basic expenses like housing and food (Morduch & Schneider, 2017). The insights from this study can be used to inform public policy options designed to help mitigate economic emergencies, such as income smoothing policies like paid sick leave, secure scheduling laws, or guaranteed minimum hours. This work can also inform how different policies and programs should be communicated, especially to those least able to handle a financial shock: those in low-wage positions or with less than a college degree, women, and single-headed households. These groups face barriers in the labor market due to discrimination or occupational segregation that make it hard to recover from shocks of any kind. Particularly for single-headed households, these groups also may lack the resources of a second stream of income at home to buffer against shocks of any kind.

Future research can delve into the nuances of income and expense shocks further by investigating whether people view financial shocks as sporadic, or indicative of a regular pattern, and how these perceptions alter their coping behavior. For example, the impact of an income shock that comes from a seasonal change in hours worked may be treated differently than an income shock that is the result of being laid off unexpectedly. Future studies can examine how existing policies can be leveraged to encourage low-income households who report being least able to handle financial shocks to develop a savings buffer. Interventions targeting low-income households can take advantage of existing policies such as the Earned Income Tax Credit, which can impact savings account ownership and behavior (Despard et al., 2018). Many low- and moderate-income filers underestimate their tax refund, and that refund can account for a significant portion of annual income (Hall & Romich,

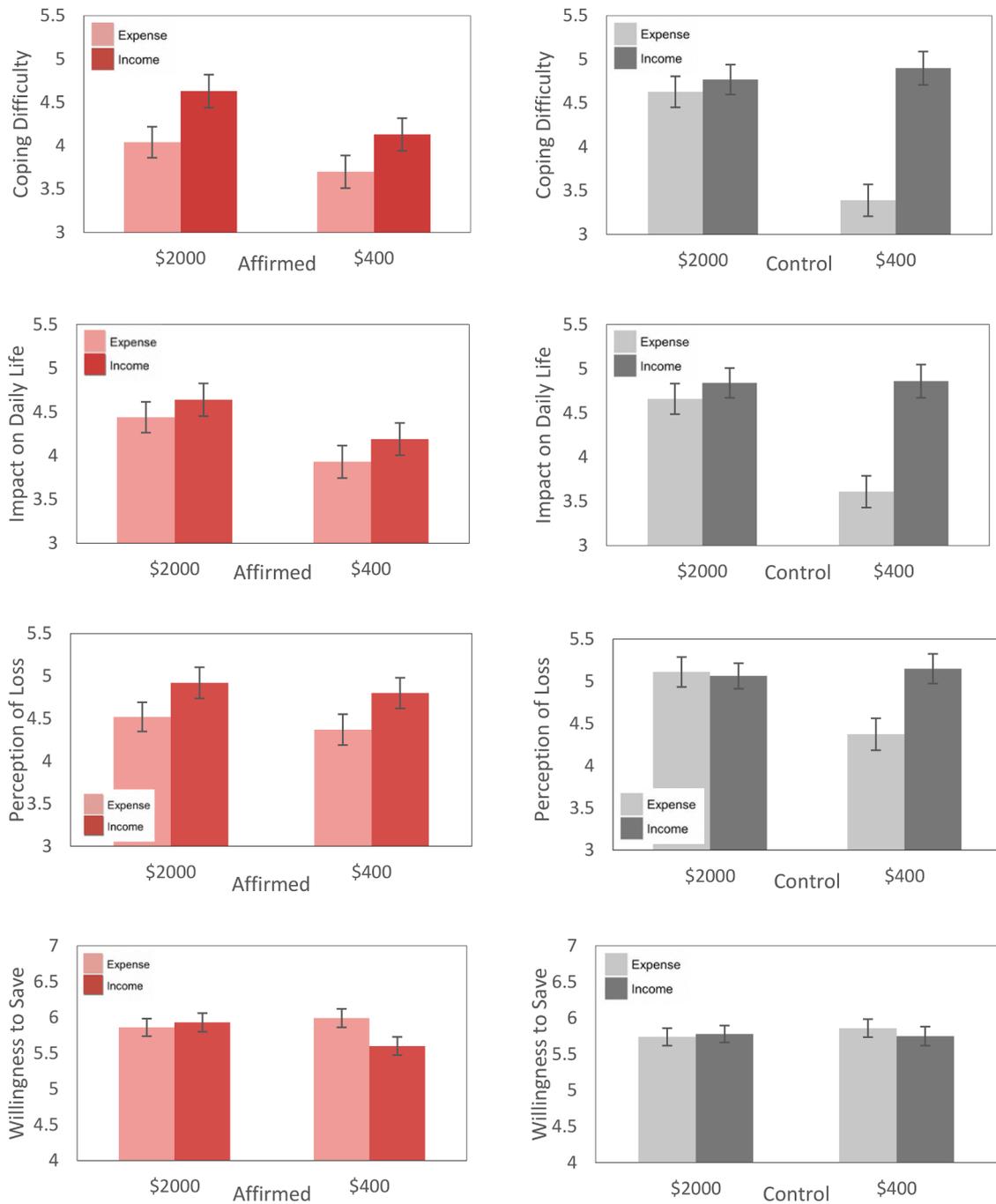


Fig. 5. Coping difficulty, impact on daily life, perception of loss, and willingness to save for affirmed condition and control condition by shock type and shock size in Experiment 3. Error bars indicate ± 1 SE.

2016). Additionally, policies like paid sick leave and paid family leave can have a targeted impact on women as women are disproportionately likely to be caregivers, and as a result, more likely to experience income shocks related to sickness of a child or caring for a new infant.

A large proportion of Americans feel unequipped to handle financial challenges (The Federal Reserve, 2019), and our research highlights that this problem is even more acute for unexpected shortfalls in income. Given the rise in income volatility (Dynan et al., 2012) and the findings of this study, people may be more vulnerable to dips in income compared to unexpected expenses. Our study highlights the need to promote thoughtful policies that consider the psychology of financial decision making to ultimately improve the financial outcomes of low-income households. As the world copes with unprecedented social

and financial challenges, the need for extreme foresight in helping individuals prepare for financial emergencies has never been more evident.

**Declaration of Competing Interest**

The authors declare no competing interests.

**Data availability**

Data will be made available on request.

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